UOT: 628.31.631.85

Nigar Zeydulla Mehdiyeva, Doctor of Philosophy
e-mail: niqus598@gmail.com

Azerbaijan Republic Ministry of Science and Education Institute of Soil Science and Agrochemistry, Baku, Azerbaijan Republic

FERTILITY INDICATORS OF SOILS IN THE SIYAZAN-SUMGAYIT MASSIVE

Abstract. *Recently, the reforms in the direction of increasing manufacture of the agricultural products, ensuring food safety have given their positive results. There are some opportunities to produce material goods, to ensure economical development, to raise people's standard of living in the country. As it is known, Azerbaijan possesses natural underground and surface resources. But the soil and water supplies are quite limited. Lately, some difficulties have been created in provision of agricultural plants with irrigated water.*

It should be noted that, one of the factors negatively affecting the agriculture is soil salinization and solonetzification. The soil salinization led not only to decrease of the productivity and qualitative indicators but also to disturbance of the ecological balance, to long-term loss of fertility and other insufficiencies. Today elimination of the same difficulties is considered one of the most important problems.

From this point of view, the researchers conducted in the deluvial salinized soils are important and definition of the fertility indicators in the same soils is considered one of the most important issues.

Keywords: *massiv, fertility, humus, salinization, solonetzification.*

https://doi.org/10.32347/2411-4049.2024.3.28-32

1. Introduction

The experimental areas have been selected as a research object in the Gilazi and Shurabad villages of the Khizi district located in the Siyazan-Sumgayit massive. The soil sections have been applied in the same areas, the samples have been taken, the required chemical analyses have been realized according to the wide-spread method [10].

2. Analysis and Discussion

With the Decree of the President of the Republic of Azerbaijan dated December 6, 2016 the issues arising from the "Strategic Road Map" are being resolved. Realization of nine strategic marks is noticed in order to create a good environment in terms of achievement of formation of the production and processing sector of the agricultural crops by grounding on stable development principles at the expense of realization of the Strategic Road Map in the country in 2016-2020 years. These strategic marks include intensification of food safety stability, increase of manufacture potential of the agricultural crops, development relevant resources, including financing, increasing the scientific certainty in agriculture and educational quality, development of the advice-information services system, development of the market structure and facilitating market access for producers, formation of mechanisms for sustainable resource use, improvement of the business environment

on agrarian area and welfare promotion issues in the villages [3]. At present, adoption of the law "On Soil Fertility" approved by the President of the Republic of Azerbaijan, Mr. Ilham Aliyev, and the State Program (2008) on the Provision of Food Products to the population in the Azerbaijan Republic in 2008-2015 regulates soil fertility indicators and requires the elimination of soil-ecological changes.

As it is known, the irrigated soils are intensively used in agriculture of our republic. These soils strongly differ for their some indicators, including physical structure and chemical compositions. The same difference shows itself in granulometric composition, salinization, solonetzification, swamping, an amount of the nutrients, eroding rate and other signs of the soils. Changes have occurred in morphological signs of the irrigated soils while they are exploited for a long time [2, 13]. Fertile soil layer is formed as a result of the mixing of various plant and animal remains and debris. Therefore, there is a great importance in correct use of soil and its protection. So, deforestation, incorrect use of the meadows caused soil weathering, i.e. washing out of its fertile layer by the water and wind [7].

The comparative analyses of the local and foreign scientists' researches show that it is impossible to use amelioration for preservation and restoration of soil fertility in the using agricultural areas. Senchukov H.A. and others show that of individually and complexly and timely application, degradation processes occurring in soil helps restoration and increase of soil fertility. Use of the different sorts of amelioration improves agro-physical, water-physical and chemical features of soils, rises humus quantity, stimulates collecting of the organic substances in soil and increases bio-metric indicators of the growing crops and this causes increase of the plant productivity [14]. The carried out investigations show that the present state of fertility of some soils isn't satisfactory in agricultural usage. Deterioration of the fertility indicators is due to the human's direct influence on soil, changes in the environment and global ecological problems. According to V.R. Williams fertility is a main and from the mountain rocks from which it is formed [11]. According to the author all the life factors of the plant is closely related to each other and equally important. It is known that one of the factors affecting the soil fertility is a quantity and composition of absorbed bases. K.K. Hedroyts has great services in formation of how that soil and experimentally determined an absorbing ability of soils [12]. It is possible to regulate the composition of absorbed cations in soils under sowing by the chemical means which serve fertility increase. There is great importance of composition of the exchangeable bases for soil fertility. Firstly, alkalinity and acidity of soils are determined by them. The soil characters change depending on quantity of Ca^{+2}, Mg^{+2}, Na^{+} and H^{+} absorbed cations in absorbing complex or ratio of soil. These cations coagulate soil colloids, restore its structure and creates water-resistant in soil aggregates. The soil possesses inconvenient feature while H^{+} ions are in absorbing complex of soil. The best condition for plant nourishment is created when the cations necessary for plant nourishment and Ca^{+2} prevail in absorbing complex of soil. Na^{+} ion peptifies colloids in absorbed form and negatively affects the physical and water-physical features of soil [6]. Study of the absorbed bases in soils is one of the main issues in determination of solonetzification process in them. The carried out scientific researches show that the sum of absorbed or exchangeable cations that can be removed from the soil is a characteristic quantity that determines its absorption capacity. It can be changed at that time when the zone is irrigated for a long time, fertilizer is applied and large agro-technical measures are fulfilled [8]. From this point of view the issues listed in the conducted researches in the Siyazan-

Sumgayit massive have been clarified. Some scientists conducted large and comprehensive researches in the massive in different years (M.A. Abduyev, A.K. Alimov, E.M. Eyvazov, M.I. Iskandarov, I.A. Akbarov, N.R. Suleymanov, I.N. Shirinov, etc). M.R. Abduyev conducted a large-scaled researches in the massive in 1968, the author studied physical, physical-chemical characters of the soils exposed to deluvial salinization and gave his suggestions. It was determined that grey-cinnamonic soils (Calcic Cypsisols) spread in a wide zone in the massive. The meadow-desert – grey-cinnamonic soils are available in the zones where grey-cinnamonic (Calcic Cypsisols) soils spread and they develop under grainy-wormwood plants in the depression areas. The grey-cinnamonic (Calcic Cypsisols) soils belong to chloride-sulfate type. Weak structure is characteristic for these soils and the humidity supply isn't great. Higher alkalinite is observed in grey-cinnamonic soils of the massive (0.08-0.13%).

As it is known, a role of the humus composition is very great in formation of soil fertility, in growing and development of the plant. The humus substance provides continuity of nutrients assimilation by the plant. Humus possesses absorbing ability and creates soil buffering together with the colloid particles. Nitrogen, phosphorus, sulfur, calcium, etc., which are main nutrients gather in humus composition. Its majority in soil is stipulation of the higher production. A main point is that, as the amount of humus decreases in soil, its participation in formation of the product becomes more effective [7]. The amount of humus was also studied in the experimental area and it was determined that its quantity on the upper layers was 1.79-1.82%.

Table 1. Composition of absorbed bases in the soils of the experimental area

Section №	Depth, cm	Mg.eq			Total Mg.eq	In % of total			Humus	pH	$CaCO_3$, %
		Ca	Mg	Na		Ca	Mg	Na			
N-1	0-23	10,12	1,75	8,75	20,62	49,08	8,48	42,44	1,79	7,87	7,95
	23-61	8,42	3,43	13,52	25,37	33,18	13,52	53,30	1,13	8,15	8,43
	61-112	6,87	5,97	11,92	24,76	27,75	24,11	48,14	0,82	8,23	8,75
	112-178	10,89	3,02	2,35	16,26	66,97	18,57	14,46	0,51	8,14	9,25
N-2	0-35	15,54	2,32	7,89	25,75	60,35	9,010	30,64	1,82	7,86	8,35
	35-68	9,35	3,67	12,13	25,15	37,17	14,60	48,23	1,16	8,18	8,58
	68-91	7,05	6,12	11,54	24,71	28,53	24,76	46,71	0,89	8,13	8,72
	91-182	9,76	2,97	2,67	15,40	63,37	19,29	17,34	0,48	8,10	9,05

Absorbed bases, a quantity of pH, humus and $CaCO_3$ have been determined in 2 sections in the research area and the obtained results have been shown on the table. As it is seen from the table, a quantity of Ca is dominant in a sum of absorbed bases and its amount is 28.53-66.97%. A quantity of Mg is 7.29-24.76% and Na is 14.46-53.30%. pH is 7.86-8.23. Accordingly, an amount of humus is 0.48-1.79% and $CaCO_3$ vibrates by 7.95-9.25%.

Generally, establishment of profitable irrigation networks, application of the progressive irrigation methods are important among the agro-ameliorative measures which have been conducted in the direction of increase of soil fertility and production of the growing agricultural plants [4, 9].

3. Conclusion

1. As a result of the researches it was determined that SAB was 20.62-25.75 mg.eq on the upper layer in the soils of the experimental area. Ca prevails in SAB and its quantity is 27.75-66.97%. Na is 17.36-53.30% and they are solonchak. This is characteristic for the same soils.

2. A quantity of humus in the same soils is 1.79-1.82%. According to the results the same soils are poorly provided with humus.

3. pH is 7.86-8.23% and these soils possess alkaline environment. An amount of $CaCO_3$ is 7.95-9.25%.

4. The researches show that application of the irrigation methods for increase of soil fertility and production of the agricultural plants and ensuring the use of complex agro-ameliorative measures are suggested.

Acknowledgments

I express my gratitude to the scientists whose materials I used for comparative analysis in this area on the topic of the article.

REFERENCES

1. Abduyev, M.R. (2012). Salinized soils of deluvial form and issues of their amelioration. 30-39.
2. Arinushkina, E.B. (1970). Guide on the chemical analysis of soils. 483.
3. Aslanov, H.G. (2004). Soils amelioration. 352.
4. Azizov, G.Z. (2006). Water-salt balance of the ameliorating soil-ground in the Kur-Araz valley and analysis of its results. 326.
5. Gedroitz, K.K. (1955). Selected essays.
6. Iskenderov, M.Y. (2018). Amelioration of salinized soils and the environment, 3.
7. Mammadov, G.Sh. (2007). Bases of soil science and soil geography. 590-592.
8. Mammadova, S.Z., & Jafarov, A.B. (2005). Fertility character of soil. 45.
9. Mustafayev, M.G. (2019). Modern state of soils in the Mughan-Salyan massive and scientific bases of their improvement. 53.
10. Mustafayev, M.G. (2020). Change of the salts quantity and type in the irrigated soils of the Mughan plain and their impact on plants productivity. *International Journal Food Science and Agriculture*, 101-108.
11. Mehdiyeva, H.Z. (2022). Salt types of soils in the territory of Siyazan-Sumgayit. *Amelioration Scientific Journal*, 3(101), 19-23.
12. Senchukov, G.A., & Ponomarenko, T.S. (2022). Effect of various types and sorts of amelioration on restoration and increase of degraded soils fertility. *Journal of amelioration and hydro-technics*, 12(1), 141-156.
13. Williams, B.P. (1949). Soil science, pub. Soch. in 2 volumes, v. II.
14. Retrieved from https://mstasc.nakhchivan.az/index.php/s-kill-r/xeberlerAmelioration
15. Retrieved from https://xazar-ih.gov.az/storage/files/38542.pdf. s. 119

The article was received 29.03.2024 and was accepted after revision 03.07.2024

Н.З. Мехдієва

ПОКАЗНИКИ РОДЮЧОСТІ ҐРУНТІВ СІЯЗАНСЬКО-СУМГАЇТСЬКОГО МАСИВУ

Анотація. Останнім часом реформи у напрямку збільшення виробництва сільськогосподарської продукції, забезпечення харчової безпеки дали свої позитивні результати. Є певні можливості для виробництва матеріальних благ, для забезпечення економічного розвитку, підвищення рівня життя людей в країні. Як відомо, Азербайджан володіє природними підземними і наземними ресурсами. Але запаси ґрунту та води досить обмежені. Останнім часом виникли певні труднощі із забезпеченням сільськогосподарських рослин поливною водою.

Слід зазначити, що одним із факторів негативного впливу на сільське господарство є засолення та солонцювання ґрунтів. Засолення ґрунтів призводить не тільки до зниження продуктивності та якісних показників, а й до порушення екологічної рівноваги, тривалої втрати родючості та інших негативних ефектів. На сьогодні усунення цих труднощів вважається однією з найважливіших проблем.

З цієї точки зору, дослідження, проведені в делювіальних засолених ґрунтах, є вкрай важливими, а визначення показників родючості в цих ґрунтах вважається одним із ключових питань.

Ключові слова: масив, родючість, гумус, засолення, солонцювання.

Стаття надійшла до редакції 29.03.2024 і прийнята до друку після рецензування 03.07.2024

Мехдієва Нігяр Зейдулла
доктор філософії, Інститут ґрунтознавства та агрохімії Міністерства науки і освіти Азербайджанської Республіки
Адреса робоча: AZ1073 Азербайджан, м. Баку, вул. М. Рагіма, 5
e-mail: niqus598@gmail.com